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Research HIGHLIGHTS

New Paint Compounds Provide Early Detection of Corrosion to Aircraft

Scientists now have a new method for attacking a chronic, billion dollar problem associated with aircraft – corrosion. Researchers supported by AFOSR discovered a paint compound that changes color when corrosion is present, allowing for earlier and less costly maintenance.

Drs. Gerald S. Frankel and Jian Zhang, from Ohio State University, supported by AFOSR and AFRL Materials Directorate, developed a paint that detects changes in acidity and alkalinity, measured as pH. The coatings they developed, incorporating phenolphathalein into the compound, change from colorless to red above a given pH.

This new corrosion technology will provide maintenance crews with an improved capability to identify and repair corroded metal. This discovery has the potential to replace the labor-intensive process of using expensive non-destructive evaluation processes to identify corrosion.

This new method will be especially useful for detecting the most troublesome corrosion, which is concealed around rivets and in the joints where sheets of metal overlap. By using this compound, maintenance crews will know corrosion is present in a joint or rivet when the surrounding area changes to a reddish color.

Conversely, the absence of any color changes will also signal that there is no corrosion present.

The researchers are also attacking corrosion on another front. Corrosion becomes apparent when using an acrylic mixed with a compound that fluoresces under ultraviolet light when above a certain pH. By measuring the emitted light with a spectrophotometer, the researchers may be able to quantify the color change and the extent of corrosion.

More information is available at this website: **http://mse-gsf1.eng.ohio-state.edu/fcc/papers/Sensing_Paint/CorroSensingCoating.htm**

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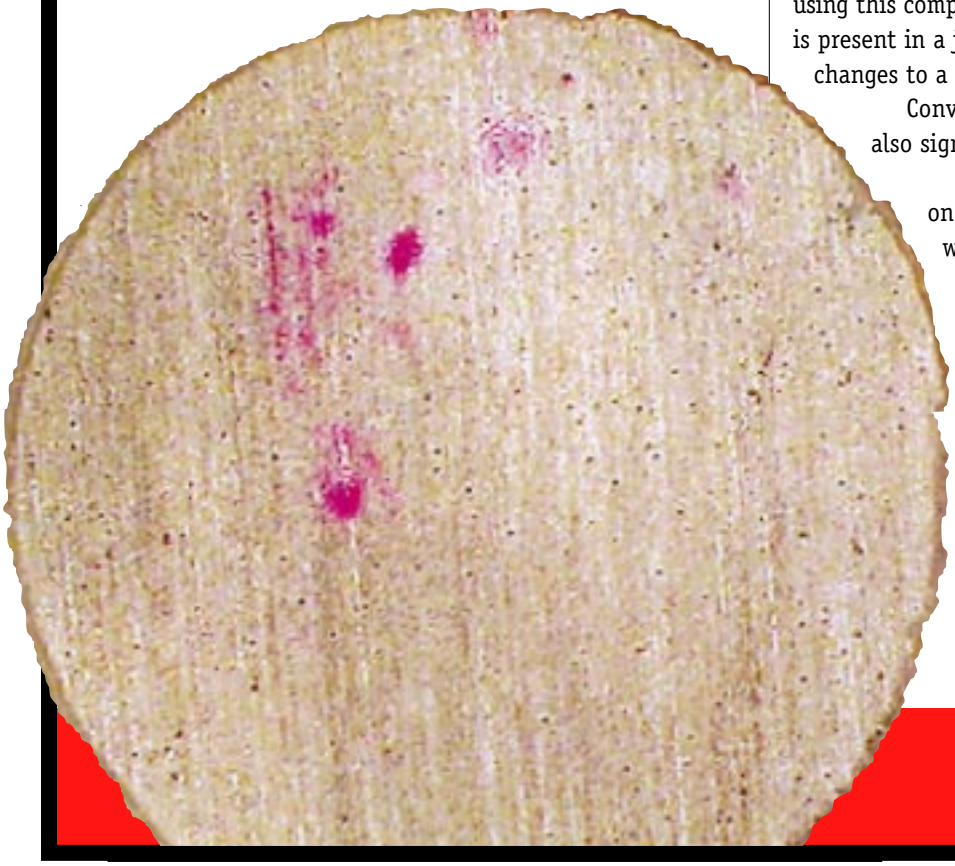

LEFT: Sample coated with acrylic+phenophthalein (critical pH=10) following exposure to 1 M NaCl for eight days.